PUBLICATIONS

OF THE

Astronomical Society of the Pacific.

Vol. XXVIII. **San Francisco, California, June, 1916** **No. 164**

ASTRONOMICAL OBSERVATIONS IN 1915.

Made by TORVALD KÖHL, at Odder, Denmark.

VARIABLE STARS.

(The instrument used is a 3-inch Steinheil, power 42.)

S *Ursæ Majoris*.[1]

Jan.	10:	S 2 steps > f′	Sept.	11:	= g.
Feb.	3:	< g.		12:	id.
Feb.	8:	id.		14:	id.
Mar.	22:	= g.		18:	id.
	23:	id.		28:	invisible
	31:	1 step > f′.	Oct.	3:	id.
Apr.	4:	3 steps < e.		7:	< g.
	11:	id.		26:	= g.
Aug.	22:	= f.	Nov.	11:	in the middle between e and f′
	31:	id.		23:	3 steps < e.
Sept.	2:	1 step > g.		25:	id.
	5:	= g.	Dec.	4:	2 steps < e.
	7:	id.		9:	1 step < e.
	9:	id.			

T *Ursæ Majoris*.[2]

Jan:	10:	T 5 steps > a.	Mar.	22:	= f.
Feb.	3:	in the middle between a and b.		23:	id:
				31:	3 steps < g.

[1] Vide the sketch in the *Publications A. S. P.*, No. 73, **12**, 56.
[2] Vide the sketch in the *Publications A. S. P.*, No. 22, **4**, 63.

Feb.	8:	= c.
Apr.	4:	4 steps < g.
	11:	very faint.
Aug.	22:	3 steps > a.
	31:	id.
Sept.	2:	id.
	5:	2 steps > a.
	7:	id.
	9:	id.
	11:	id.
	12:	id.
Sept.	14:	1 step > a.
	18:	= a.
	28:	½ step > a.
Oct.	3:	id.
	7:	= a.
	26:	= b.
Nov.	14:	= c.
	23:	2 steps > d.
	25:	id.
Dec.	9:	in the middle between e and g.

W *Pegasi*.[1]

Jan.	10:	W invisible.
Sept.	2:	in the middle between d and e.
	5:	2 steps > e.
	7:	1-2 steps > e.
Sept.	11:	1 step > e.
	14:	= f.
Oct.	7:	2 steps < g.
Nov.	25:	utmost faint.

SS *Cygni*.[1]

Jan.	10,	6^h:	SS 3 steps > e.
Feb.	3,	7^h:	< g.
Apr.	11,	12^h:	invisible.
Aug.	31,	9^h:	2 steps < c.
Sept.	2,	9^h:	id.
Sept.	5,	9^h:	in the middle, betw. d and e.
Sept.	7,	9^h:	< e. > f.
	11,	9^h:	1 step < f.
Nov.	14,	10^h:	= g.
Dec.	9,	8^h:	< h.

U *Herculis*.[1]

Apr.	11:	U in the middle between a and b, b 2 steps > c.
	18:	1 step < a.
	28:	id.
Sept.	2:	= g.
	5:	id.
	7:	id.
Sept.	11:	1 step < g.
	14:	= h.
	28:	id.
Oct.	3:	2 steps < h.
	7:	3 steps < h.
	29:	utmost faint.
Nov.	25:	invisible.

S *Persei*.[2]

Apr.	11:	S = e.
	18:	= e.
Aug.	31:	1 step < d.
Sept.	5:	= d.
Sept.	14:	in the middle, between d and e.
Oct.	26:	< d. > e.
Nov.	15:	= e.

[1] Vide the sketch in the *Publications A. S. P.*, No. 141, **24**, 109.
[1] Vide the sketch in the *Publications A. S. P.*, No. 135, **23**, 42.
[2] Vide the sketch in the *Publications A. S. P.*, No. 135, **23**, 43.

Var. 25, 1913, *Ursæ Majoris.*

(B. D. + 60° 1412 ($9^m.5$) = f in the sketch on T *Ursæ Majoris*)

Jan.	10:	f 2 steps < g.
Feb.	3:	= g.
Mar.	22:	2 steps > g.
	23:	> g
	31:	a little > g.
Apr.	4:	1 step > g.
	11:	id.
Aug.	31:	1 step < g.
Sept.	2:	id.
	5:	½ step > g.
	7:	= g.
	11:	id.
Sept.	12:	1 step > g.
	14:	= g.
	18:	1 step < g.
	28:	½ step > g.
Oct.	3:	1 step < g.
	7:	1 step > g.
	26:	id.
Nov.	14:	= g.
	23:	> g.
	25:	1 step > g.
Dec.	9:	1 step < g.

Several other stars have been watched, such as Y *Tauri,* which in this year have been noted > A = B. D. + 20° 1095, especially in March and April.

Large Meteors.

Fireballs have been observed from stations in Denmark and surrounding countries on the following dates: January 10th, 17th (five observations), 23rd, February 8th, 26th (two observations), 27th, March 22nd, 25th, 28th, April 16th, May 9th, 11th, 13th (seventeen observations), 24th (six observations), June 11th (two observations), 21st, 23rd, 25th (two observations), 30th, July 2nd, August 11th, September 7th, 9th, 16th (two observations), 19th (seven observations), October 8th (three observations), November 16th (two observations), December 12th, 16th, 20th, 30th.

Shooting-stars.

Shooting-stars were observed at five stations in Denmark, one in Schleswig and one in Sweden from August 9th to 12th, furthermore at two stations in Denmark in the morning-hours on November 15th and 16th. At these stations 279 paths of shooting-stars were mapped, and 10 proved suitable for calculation. These 10 meteors have given the following results:—

FROM OBSERVATION.

No.	Time, P. M.	Station.	Beginning.	Ending.	Mag.	Observer.
1	Aug. 11, 10h 30m	Tyderup	285° +46°	.....	2	M. Povlsen.
		Copenhagen	233 +25	.....	2	S. Kierulff.
2	Aug. 11, 10 42	Ulderup	.....	296° +11°	3	A. Bartram.
		Copenhagen	.....	239 ÷ 9	3	S. Kierulff.
3	Aug. 12, 10 1	Varde	25 +48	11 +47.5	2	N. Bossen.
		Barsebäk	190 +55.5	204 +35	2	W. Norlind.
4	Aug. 12, 10 40	Varde	19 +40	8 +42	5	N. Bossen.
		Arlöse	190 +62	200.5 +36	2	K. Kaestel.
5	Aug. 12, 10 42	Ulderup	.....	49 +30.5	3	A. Bartram.
		Barsebäk	.....	222 +24		W. Norlind.
6	Aug. 12, 11 18	Odder	339 + 0	357 ÷ 6	1	J. Skakke.
		Tyderup	310 +10	331 + 4	1	M. Povlsen.
7	Aug. 12, 11 27	Varde	57 +47	.....	3	N. Bossen.
		Tyderup	148 +72	.....	1	M. Povlsen.
8	Aug. 12, 12 4	Varde	.....	26 +13	4	N. Bossen.
		Tyderup	.....	330 +30	1–2	M. Povlsen.
9	Nov. 15, 16 32	Husby	182 +33	201 +44	2	Rasmussen.
		Tyderup	30 +62	0 +55.5	2	M. Povlsen.
10	Nov. 15, 16 42	Husby	.....	212 +29	2	Rasmussen.
		Tyderup	.....	316 +64	2	M. Povlsen.

FROM CALCULATION.

No.	Beginning.				Ending.				Real length of the path.	Radiant.
	h	λ		φ	h	λ		φ	β	AR Decl.
1	55.0	1°	14′.4	55° 35′.7						
2					38.5	2°	52′.8	54° 39′.2		
3	134.4	1	32.4	56 43.0	107.3	2	16.8	56 11.3	80.7	53°+44°
4	96.7	2	4.6	56 4.3	67.0	2	58.8	55 48.6	70.4	33 +35
5					37.4	0	53.5	55 47.3		
6	75.6	1	3.2	54 59.0	37.6	0	44.2	55 15.7	53.5	257 +16
7	120.9	1	28.7	56 59.4						
8					84.6	0	54.5	55 19.3		
9	111.7	2	17.6	50 19.0	97.0	2	34.1	56 44.5	53.6	136 ÷14
10					37.7	1	25.7	56 35.8		

h and β are expressed in kilometers; λ is west longitude from Copenhagen; φ is north latitude; h is the altitude of the meteor above the Earth's surface.

The Carina-Meteor catalog has now reached the number of 6266 meteors, observed from stations in Denmark and surrounding countries from 1875 to 1915 inclusive.

From August 2nd to 7th, inclusive, astronomical lectures were held at the Carina Observatory in Odder.

In the estimation of variable stars I have been assisted by Mr. J. Skakke, who, also by the aid of a 78mm Darlot lens, has photographed several regions of the heavens.